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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/570,669

03/06/2006

Akihiko Endo

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EXAMINER

SARKAR, ASOK K

ART UNIT

PAPER NUMBER

2891

NOTIFICATION DATE

DELIVERY MODE

04/25/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gbpatent@gbpatent.com
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Office Action Summary	Application No. 10/570,669	Applicant(s) ENDO ET AL.	
	Examiner Asok K. Sarkar	Art Unit 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/14/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 3, 5 and 10 is rejected under 35 U.S.C. 102(b) as being anticipated by Kikuchi, US 5,753,353.

Regarding claim 1, Kikuchi teaches a manufacturing method for an SOI wafer comprising the steps of:

- bonding a wafer for active layer 1a with a supporting wafer 3 via an insulating film 2 interposed therebetween to thereby form a bonded wafer (Fig. 3C);
- and then reducing a film thickness in a part of said active layer wafer of said bonded wafer to thereby form an SOI layer for manufacturing said SOI wafer, wherein said supporting wafer that has been bonded contains boron by an amount of 9×10^{18} atoms/cm³ or more (column 5, line 5).

Regarding claim 3, Kikuchi teaches said SOI layer has a thickness of 0.10 μ m or thinner (column 6, line 30).

Regarding claim 5, Kikuchi teaches an insulating film 2 is formed at least on a surface opposite to a bonding surface of said supporting wafer before said step of bonding with reference to Figs. 3A – 3C

Regarding claim 10, Kikuchi teaches all limitations of this claim as was described earlier in rejecting claims 1 and 3.

This is a product by process claim.

Note that a “product by process” claim is directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or not. Note that applicant has the burden of proof in such cases, as the above case laws make clear.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 2, 4 and 6 – 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi, US 5,753,353 in view of Sakaguchi, US 6,613,678.

Regarding claim 2, Kikuchi fails to teach the steps of: ion – implanting of hydrogen gas or a noble gas element to said active layer wafer to thereby form an ion – implanted layer in said active layer wafer; subsequently bonding said active layer wafer and said supporting wafer together to thereby form a bonded wafer; and then heat treating said bonded wafer to thereby induce cleavage in said bonded wafer at the site of said ion – implanted layer as an interface.

Sakaguchi teaches a method of forming SOI wafers comprising the steps of ion – implanting of hydrogen gas or a noble gas element to said active layer wafer to thereby form an ion – implanted layer in said active layer wafer; subsequently bonding said active layer wafer and said supporting wafer together to thereby form a bonded wafer; and then heat treating said bonded wafer to thereby induce cleavage in said bonded wafer at the site of said ion – implanted layer as an interface with reference to Figs. 2 – 6 in between column 6, line 5 and column 7 line 25 for the benefit of establishing a

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manufacturing process for SOI substrate that is free of oxidation induced stacking faults in column 3, lines 3 – 8.

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Kikuchi and implement the steps of ion – implanting of hydrogen gas or a noble gas element to said active layer wafer to thereby form an ion – implanted layer in said active layer wafer; subsequently bonding said active layer wafer and said supporting wafer together to thereby form a bonded wafer; and then heat treating said bonded wafer to thereby induce cleavage in said bonded wafer at the site of said ion – implanted layer as an interface for the benefit of establishing a manufacturing process for SOI substrate that is free of oxidation induced stacking faults as taught by Sakaguchi in column 3, lines 3 – 8.

Regarding claim 4, the limitation of the claim has been described earlier in rejecting claim 3.

Regarding claims 6 – 8, the limitations of the claims have been described earlier in rejecting claim 5.

7. Claims 9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi, US 5,753,353 in view of Samata, US 6,008,110.

Regarding these claims, Kikuchi fails to teach the supporting wafer is subjected to annealing at 1100°C or higher in a reducing gas atmosphere containing hydrogen gas before said step of bonding.

Samata teaches a method of manufacturing SOI wafers in which the supporting wafer is subjected to annealing at 1100°C or higher in a reducing gas atmosphere

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containing hydrogen gas before said step of bonding (column 7, lines 30 – 41) for the benefit of reducing oxidation induced stacking faults on the substrates and removal of Fe by gettering in column 7, lines 20 – 29.

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to modify Kikuchi and subject the supporting wafer to annealing at 1100°C or higher in a reducing gas atmosphere containing hydrogen gas before said step of bonding for the benefit of reducing oxidation induced stacking faults on the substrates and removal of Fe by gettering as taught by Samata in column 7, lines 20 – 29.

8. Claims 11 – 13 and 15 – 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi, US 5,753,353 in view of Sakaguchi, US 6,613,678 as applied to claim 2 above, and further in view of Samata, US 6,008,110.

The limitations of the claims have been described earlier in rejecting claims 9 and 14.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asok K. Sarkar whose telephone number is 571 272 1970. The examiner can normally be reached on Monday - Friday (8 AM- 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William B. Baumeister can be reached on 571 272 1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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10. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Asok K. Sarkar/
Primary Examiner, Art Unit 2891

April 21, 2008